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THE DENTAL PRACTITIONER

monthly journal for the Practitioner and his Staff

VOL. II, NO. 5 JANUARY, 1952

Incorporating the Official Supplement of
The Dental Laboratories Section of the Surgical Instrument Manufacturers' Association

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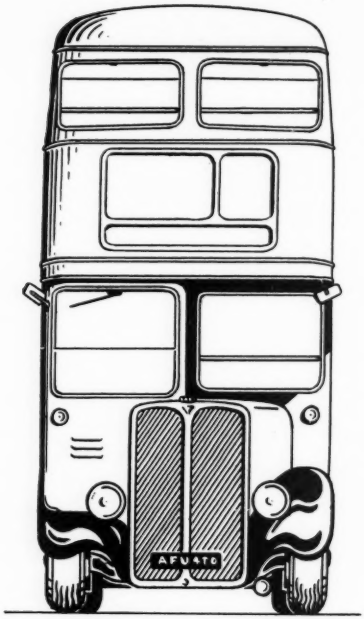

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THE DENTAL PRACTITIONER

A Monthly Journal for the Practitioner and his Staff

(Incorporating the Proceedings of the British Society of Periodontology and the Official Supplement of the S.I.M.A.—Dental Laboratories Section)

Editor: JOHN E. SEEAR, L.D.S. R.C.S.

Associate Editors :

H. MANDIWALL, M.B., B.S., L.D.S.

N. LIVINGSTONE WARD, L.D.S., D.D.S.

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THE
DENTAL PRACTITIONER

A Monthly Journal for the Practitioner and his Staff

Vol. II, No. 5 January, 1952

EDITORIAL

PER ARDUA AD ASTRA

THIS month we take a very great pride indeed in presenting an issue devoted in the main to the Dental Branch of His Majesty's Royal Air Force. To Air Commodore G. A. Ballantyne, C.B.E., D.F.C., F.D.S. R.C.S., K.H.D.S., the Director of Dental Services, and his officers we tender our grateful thanks for their co-operation in the production of this number.

FOREWORD

By **Air Commodore G. A. BALLANTYNE**, C.B.E., D.F.C.

I WAS very pleased to be asked by the Editor to submit articles written by officers of the Royal Air Force Dental Branch for inclusion in a special number of this journal to be dedicated to our Service. The offer seemed to provide an excellent opportunity for telling the profession something of the aims, achievements, and frustrations of our Branch.

A past President of the British Dental Association said of our Central Dental Laboratory that it presented an entirely new conception of public dental service. We have tried to live up to this assessment of our aims, but unfortunately we have encountered major difficulties: first the war, and then the emergence of the National Health Service, with its adverse repercussions upon the salaried services.

Through all vicissitudes, the R.A.F. Dental Branch has maintained a high professional standard, and we provide an environment in which the best work is encouraged, insisting that quality is more important than quantity.

It had been our intention, when the war ended, first to overtake the arrears of conservative treatment, and then to switch the emphasis of our work to preventive dentistry. This hope has been defeated by the shortage of dental officers. Our problem has been how to dispense the treatment available in such a way as to do the greatest good for the greatest possible number.

SOME CONSIDERATIONS IN THE TREATMENT OF THE THIRD MOLAR

By **Wing Commander W. O. BAIRD,** M.B.E., F.D.S. R.C.S., M.R.C.S., L.R.C.P.
Specialist Officer in Dental Surgery

In the Royal Air Force at the present time, as in the other Services, a considerable number of the personnel are National Service men around the ages of nineteen to twenty-one years. It is in this age group that one would expect to find the normal eruption period of the third molars, and it might not be inappropriate to consider these teeth and give some general impressions gathered from past experience.

A B

Fig. 1.—Radiographs of unerupted upper third molar showing marked buccal deflection. A, Lateral view; B, Occlusal view.

In the normal mouth the eruption of the third molars usually takes place without any untoward symptoms. But many mouths seen to-day have a tendency to have insufficient room for the full eruption of these teeth into full functional efficiency, particularly lowers.

The upper third molar will be considered first. This tooth will become fully erupted in a mouth where there is insufficient room for it to be functional. It assumes a disto-buccal position so that it is more or less pushing outwards into the cheek. In this position the tooth, besides being functionless, is difficult to keep clean, and it is not long before an area of decalcification, the precursor of caries, appears on the buccal surface. The unerupted upper third molar appears on radiographs to lie up against the second molar, commonly in the apparent concavity formed between the apex of the distal root of this second molar and its neck. In exposing these unerupted teeth for removal it is usually found that the occlusal surface is facing buccally or disto-buccally, indicating that the teeth are lying in that axis and are not vertical. It would therefore seem that there is a developmental tendency for upper third molars to be deflected buccally or disto-buccally. (*Fig.* 1.)

The upper third molar, unlike the lower third, does not ordinarily give rise to the acute symptoms. Occasionally the gum over an erupting tooth becomes inflamed, or there is ulceration of the cheek from irritation by the buccally deflected third molar. The treatment is removal of the cause. The unerupted upper third molar may give rise to no symptoms whatever. Before attributing symptoms to an unerupted tooth, it is well to exclude other possible dental causes, and more will be said of this further on. The unopposed upper third molar usually becomes overerupted and calls for removal.

The lower third molar when normally erupted and functional should have its occlusal surface free of soft tissue and the distal surface of its crown should also be uncovered. Where there is lack of space for this tooth to become fully erupted, various conditions may present themselves.

These conditions may be related to two distinct classes, the partly erupted tooth and the unerupted tooth. In the class of the partly erupted tooth this may be subdivided further into vertical, disto-angular, mesio-angular, horizontal, and lingual deflection, according to the position of the tooth. The unerupted tooth may also assume any of these positions, but for the present purposes these need not be stressed.

The lower third molar most frequently assumes a vertical position. The alveolar bone carrying the third molar extends backwards lingual to the external oblique ridge of the mandible so that the tooth can erupt vertically and yet be partly covered by the normal soft tissue present in the retromolar fossa region. This is a fairly common occurrence and may give rise to symptoms of varying degree. The first complaint, as the patient puts it, is usually of soreness of the gum over the tooth that is coming through at the back of the mouth. This is a mild inflammation of the soft tissue over the tooth—pericoronitis. It may be caused by the biting of the upper third molar on to this soft tissue or the discomfort may be aggravated by the fact that the swollen soft tissue is now meeting the upper tooth. In either case the pericoronal tissue has become infected. The treatment of this depends on whether it is decided that the tooth will erupt and become fully functional. If the decision is that it will become fully functional, then careful hygiene for a day or two, followed by excision of the overlying tissue, should be sufficient. But if the tooth will never become functional, then it should be removed when the soft tissue has recovered. This recovery may be accelerated by the early removal of the upper third molar, which anyhow will be functionless after the loss of the lower third molar.

It should be stressed that this is the time to decide whether the lower third molar will become functional or not. It is not sufficient to adopt the attitude that the tooth will probably come through all right in time. So many of them do not. The second attack of pericoronitis is more severe, and the third usually ends up in the patient presenting with trismus and spread of the inflammation into the buccal or submandibular soft tissues, with or without abscess formation. It is in the interests of the patient to advise removal of the tooth when quiescent instead of waiting for a crisis. This can usually be accomplished without much operative difficulty and the patient has an easy recovery. The bone is soft and little trauma need be inflicted.

Fig. 2.—Radiograph of lower third molar associated with chronic pericoronitis of over one year's duration. The distal part of the crown lies lingual to the shadow of the ascending ramus.

When the condition is neglected the patient may go about with a more or less chronic state of pericoronitis which has its subacute phases. (*Fig.* 2.) There is a fœtid breath, and when the patient opens the mouth the third lower molar is seen covered in a coat of shiny mucus and pus and surrounded by a hood of soft tissue which is inflamed. The pain leads to neglect of oral hygiene, and mastication is avoided on the affected side so that there is usually an associated gingivitis around the adjacent teeth. If this goes on for a long time, and patients have been seen who admit to a ten years' history, there are changes in the structure of the bone, the tooth, and the surrounding soft tissues. The bone becomes sclerosed and the tooth exostosed, so that the ultimate removal is more difficult, the patient has a less comfortable

recovery, and of course before radical treatment is undertaken the whole area must be cleaned up and brought into as healthy a state as possible.

The partly erupted disto-angular impaction may also give rise to similar conditions. The treatment is perhaps even more obviously radical, as this tooth will never function.

The mesio-angular tooth which is partly erupted and the horizontal impaction also partly erupted, do not so commonly give rise to the same soft-tissue involvement. These teeth usually provide a food trap which is most

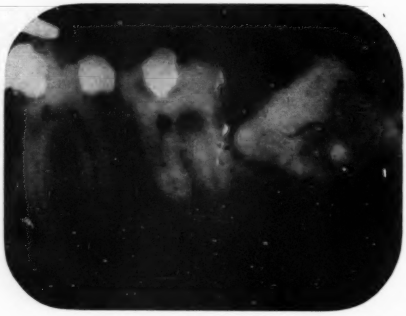


Fig. 3.—Radiograph of lower molar region. Caries under fillings which should be investigated before attributing symptoms to the unerupted tooth.

difficult to keep clean. As a result caries starts in the distal aspect of the second molar, usually in the region of the neck. Caries may also commence in the third molar. This process goes on slowly, undetected by the patient and frequently by the dental surgeon also. As the cavity gets larger so the impacted tooth may move forward into the cavity. Then comes a time when the patient complains of acute toothache and on investigation it is found that the second molar is unsaveable. So the patient loses a functional second molar and a third molar which should have been removed before the second molar was involved. On the other hand, caries may not arise in the second molar, but a chronic periodontitis of the distal root of this tooth occurs, sometimes accompanied by alveolar loss, leading to the extraction of the second molar.

The lingually deflected third lower molar which is partly erupted can give rise to similar symptoms to the partly erupted vertical tooth.

Erupting lower third molars may also give rise to another symptom—that is, a feeling of pushing which causes discomfort. An erupting third lower molar for which there is insufficient room or which is misplaced can cause sufficient pressure on the second molar so as to disrupt the arch. As a secondary result of this the upper arch may also become disorganized and the incisors become spaced from the forward thrust of the lower teeth.

Unerupted third molars may or may not give rise to symptoms which can be attributed to them. The fact that an unerupted third molar is discovered on X-ray examination is no justification for its removal without consideration. If the patient has no symptoms and the radiograph shows no degenerative changes, then removal of the tooth is not imperative. Factors that should be borne in mind are the general consensus of opinion at present that unerupted teeth are not infected, and the reaction against the theory that focal sepsis is the cause of many diseases. Focal sepsis should be eradicated to improve the general health of the patient, but not with the promise of curing some disease. Unerupted teeth with no pathological changes, as seen in the X-ray, cannot be looked upon as foci of infection. Then again, unerupted teeth are potential weaknesses in the bone, so that trauma may cause a fracture through the line of the unerupted tooth. But it is highly unlikely that any patient would submit to an operation merely to remove a possible weakness from the impact of a hypothetical blow, unless he were a prize fighter. After all, people are not subjected to examination for Meckel's diverticulum so that this potential danger may be removed, and it seems equally unnecessary to X-ray everyone for unerupted molars. Certainly X-ray to see what the position is, but only treat on the merits of the case.

When other causes of pain have been excluded, then the unerupted third molar may be suspected, and classically it may give rise to referred pain in the ear.

The diagnosis of pain attributable to a third molar should not normally present great

difficulty. It is not sufficient to conclude that, because a partly erupted third molar is seen, it is the cause of the symptoms. The pericoronitis with pain should be evident, but in the absence of this the other teeth on the same side of the mouth should be investigated. Acute pain is more likely to be due to involvement of the pulp in another tooth, and attention has been drawn to the distal aspect of a second molar. Not infrequently cases have been seen ostensibly for removal of partly erupted third molars giving rise to pain where in fact the symptoms were due to caries in other teeth on the same side of the mouth. (*Fig.* 3.) It is equally important to eliminate pain referred from other teeth in assessing the culpability of an unerupted molar as a cause of the symptoms. The possibility of curing vague headaches and such-like symptoms by the removal of unerupted teeth should be approached with caution. The disorganization of the dental arch by pressure from the third molars also merits consideration in deciding the treatment of these teeth.

This is not an exhaustive treatise on the third molar, it is only intended to emphasize the desirability of dealing radically with the non-functional partly erupted third molar at an early stage, before it gives rise to complications and when it can be more easily treated.

SOME OBSERVATIONS ON FULL DENTURE TECHNIQUE ASSOCIATED WITH DIFFICULT CASES

By **Wing Commander K. G. SHARVILL**, F.D.S. R.C.S.

Specialist in Dental Prosthetics

THE subject of these notes has been described by many eminent prosthetists over a period of years, but it is suggested that the following points may help to assess the various techniques when called upon to design full dentures for difficult or unusual mouths.

In considering any particular abnormality reference will be made to the extreme case, and the less severe case will admit some modification of the general rule.

One is inclined to think and talk in terms of dentures or false teeth, but since our primary object is to equip the patient with an apparatus suitable for efficient mastication it is better to approach the case with this thought in mind, rather than to concentrate upon restoration of appearance. If we do this we shall be more inclined to apply the all-important general principles of mechanics to the construction and design of the denture.

While it is stressed that fully functional dentures must be the prime objective, it is also our aim to restore the patient's looks. Too often, however, one sees examples of satisfactory restoration of appearance at the expense of full function. Such cases must be regarded as failures, as it is nearly always possible to achieve both objectives. Naturally, there are extreme cases when we have to deviate from the ideal æsthetic set-up in order to obtain maximum function, and perhaps the best example of this is the ridgeless lower jaw. Frequently in such cases it is advantageous to reduce the vertical dimension below what might be considered desirable for æsthetic reasons in order to obtain the maximum stability of the lower denture.

In building a house the first requisite is a good foundation. In constructing a denture the model is the foundation, and this must be the best obtainable. This is possible only if a true impression has been taken of the parts of the mouth to be covered by the fitted denture.

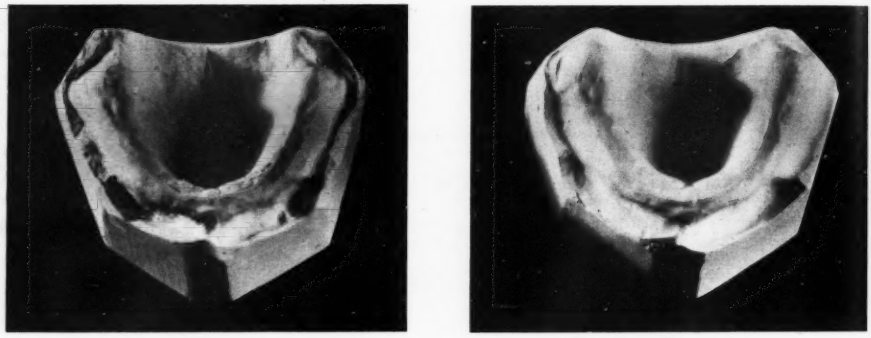
UPPER JAW

If it is acknowledged that the periphery is the most important part of the denture, the periphery of our impression must be accurate.

This should be no thicker than $\frac{1}{16}$–$\frac{1}{8}$ in. On removing the impression from the mouth, if it is $\frac{1}{4}$ in. or more wide, then we have moved the soft tissues from their natural resting position, and the periphery of the upper denture will fail to obtain maximum seal when in position. It will be impossible to outline the flanges of the denture accurately on such a model. However, outlining correctly on a model produced from an impression with the narrow margins is achieved, and the denture outlined as described, no easing should be necessary to the periphery of the denture.

The back edge of the finished denture should be about $\frac{1}{8}$ in. on the soft palate. Thus the tray must also extend as far back, and be straight across from tuberosity to tuberosity.

The back edge of the finished denture will be much less curved than is generally seen. It may be pointed out here that this additional



A B

Fig. 1.—Upper jaw. A, Narrow edge to impression, allowing denture to reach full height of sulcus with good retention ; B, Impression too wide, maximum retention thereby lost.

simple. A narrow trough is left on the model (*Fig.* 1 A), and a pencil held vertically and run through this trough will give the correct outline for the periphery of the denture.

A glance at *Fig.* 1 will make this point quite clear. *Fig.* 1 B is the result of too wide an impression; the effect on the periphery of the plate will be twofold: (1) It will fail to reach the correct height in the sulcus; (2) It will fail to hug closely at the edge. Thus the chance of maximum retention is lost.

Fig. 1 A shows the result of the narrow edge to the impression; the denture will reach the full height of the sulcus and will be closely adapted to the oral tissue.

In order to obtain the ideal impression a special tray made to a composition model should always be used. This tray should be about $\frac{1}{16}$ in. thick and cut short by $\frac{3}{16}$ in. of the full height of the sulcus. This will ensure that the impression material is not forced up by the tray margin, so pushing the soft tissues beyond the normal resting position. If this is

length to the palate will not produce gagging in the average patient, and more often is a cure for this distressing condition. The old treatment for gagging was to cut the palate of the denture shorter. In the experience of the writer a new upper denture with an extended palate is the cure.

LOWER JAW

Upper dentures do not as a rule present us with many difficulties, but unfortunately this cannot be said of lowers. As with the upper, it is necessary to have a tray made to a composition impression. In the case of the upper the tray material can be fitted directly on to the model, but in the lower the model should first be covered with a single thickness of wax or three or four wet dental napkins. The reason for this is that for practical purposes the lingual side of a lower ridge is vertical, and if the tray does not "stand off " the jaw, the impression material is pushed down into the floor of the mouth when settling the tray. On removing

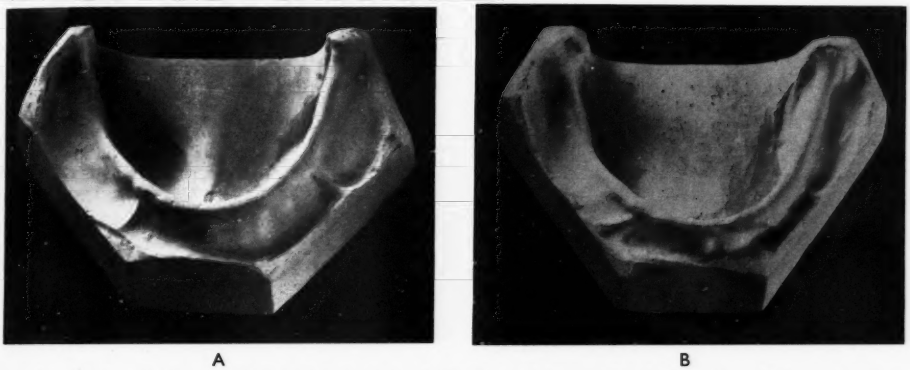
the tray it will be found that the tray is showing through in large areas, and the impression material will be so thin that it cannot be pieced together.

In taking the upper impression it was found that overextension by too thick a margin gave a shortened sulcus and lack of adaptation of the denture at the periphery. In the lower the result obtained by excess bulk in the sulcus gives an artificially deepened sulcus, not a shallower one as might be expected.

Fig. 2 A shows a model resulting from this overextension through the bulk of the material being allowed to remain in the sulcus. Note the increased depth when compared with *Fig.* 2 B, which is the same mouth, but with the tray cut short by $\frac{1}{4}$ in. on the buccal flange.

The procedure for clearing this excess impression material is simple. Having settled the tray in the mouth the first finger is placed across the tray in the premolar region to steady it. Place the first finger of the other hand in the mouth, almost reaching the ascending ramus, and gently press the finger outwards, running up the cheek. This will lift the excess material up and lingually on to the tray. Now gently pat the cheek several times to settle the impression material without force, thus avoiding deepening the sulcus into an artificial position. It is well to remember that the consistency of the impression material should be such that the tissues will mould it, rather than be pushed into some position other than the natural resting position.

It will be noted that no mention has been made of muscle trimming, but "natural resting position" has appeared several times. Let it be stressed that, providing the tray is correctly made (special reference is made to the shortening of the trays at the flanges), the resulting impression has the required thin edges. The impression material is patted into position and not forced up or down as the case may be; the muscles or fræna will then be left in their natural position, and will in no way dislodge the denture or become injured by friction through being covered by ill-designed flanges.



A B

Fig. 2.—Lower jaw. A, Overextension through bulk of material remaining in the sulcus; B, Impression of the same mouth but with tray cut short on the buccal flange.

A glance at *Figs.* 1 and 2 will be more convincing than words.

Figs. 1 B, 2 A show position of the frænum on a model when the impression is too wide.

Figs. 1 A, 2 B show the same fræna resulting from the narrow-edged impression.

Note that in *Figs.* 1 B and 2 A the fræna run out towards the cheek roughly at right angles to the alveolar ridge, but in *Figs.* 1 A and 2 B when they are undisturbed they lie flatter on the side of the ridge, and tend to run anteroposteriorly. It is no use trying to see if the denture fits when inserted, for in order to see the periphery of the denture the lip and cheek must be held away, putting them in exactly the same position as does the wide-margined impression.

BITE

It is not proposed to discuss the various methods for recording the bite, but one or two points may be mentioned with advantage. The first step towards a successful denture is to establish maximum stability of the lower bite block. A much better name for a bite block would be a toothless denture. A moment's thought will soon make this clear. The toothless denture when finally adjusted should represent in all respects the finished denture less the teeth. It should cover the same area, it should have the same vertical dimension, and be so trimmed as to represent the final position of the teeth. It is well to remember that if either of the dentures is unstable both will be unsatisfactory.

It is generally agreed that full lowers are more difficult than uppers, and since the aim is to obtain a stable lower, it follows that it is essential to obtain by trial the correct depth of the labial, buccal, and lingual flanges. These should be as deep as possible without causing lifting of the block. Care should be taken to see that the lingual frænum has freedom of movement, and the labial surface of the block should be trimmed to avoid lifting by the lip.

In other words, we must trim the block so that it occupies the neutral area, as near as possible midway between the influences of the lips and tongue, and cheeks and tongue.

With the upper block there are only two parts we can check: the angle of the labial face and the correct position of the posterior edge.

Several ways have been suggested to aid the operator to assess the correct vertical dimension. One, if not the oldest, is from all practical points of view the best—namely, to make the distance from the columella to the tip of the chin the same as the distance from the outer canthus of the eye to the junction of the lips.

This will be found to be correct, or nearly so, for the majority of patients. A slight adjustment according to the individual operator's assessment is, of course, permissible.

One very important point should always be borne in mind. It is preferable to close a little rather than to open, as a patient with an opened bite will seldom be comfortable. After all, closing the bite against the assessed correct vertical dimension is often the solution to the difficult lower jaw.

SET-UP

The position of the teeth in relation to the ridge when setting up is of the utmost importance. The value of a perfect impression, correct vertical dimension, and correct periphery determination can be completely neutralized if the teeth are incorrectly placed.

There are some rules for setting up from which we seldom stray. Let us consider the case of the ridgeless lower or inferior retrusion. How often a patient who is not happy with the full denture complains that his lower denture moves when he talks. This condition is usually produced by one or both of the following errors; either the vertical dimension is too large; or the teeth are not set up to the ridge. The latter mistake is far too common and is due to allowing æsthetic to come before mechanical considerations in the architecture of the denture.

When it is stressed that teeth should be on the ridge it does not mean that they must necessarily be vertical. With the ridgeless lower, the teeth may lean towards the tongue. In inferior retrusion the teeth will be vertical, but in both cases the teeth can, and should, be on the ridge. The test is simple: A line dropped through the long axis of the tooth should fall through the centre of the ridge. In setting up molars and premolars they cannot always be set up anatomically, but the all-important rule is that their relation to the ridge and each other must be such as to assist stability. Consider the case of a wide lower jaw and a narrow upper. If the lower molars and premolars are set up so as to occlude with the uppers anatomically, it will be impossible for the lower to remain stable. By applying the law of levers we evolve this rule: lower molars and premolars should never lean lingually. A good test for this is to hold the full lower with the occlusal surface upwards. It should be possible to see denture base on each side, and the lingual cusps should never overhang on the tongue side. If these simple fundamental rules are studied and practised, functional and æsthetic dentures will result.

MOBILE DENTAL SURGERIES

By **Air Commodore G. A. BALLANTYNE**, C.B.E., D.F.C., F.D.S. R.C.S., K.H.D.S.
Director of Dental Services, Royal Air Force Dental Branch

MOBILE dental surgeries were first used in the Royal Air Force during the early days of the second world war, when it became apparent that under active service conditions an efficient dental service could not be organized on a purely static basis. Large numbers of small signals and balloon units had sprung up in isolated and remote parts of the country and it was impossible to provide dental cover for these except by means of mobile surgeries.

Previously the possibility of extending the use of field dental equipment had been considered. This equipment, packed in panniers, was compact and comprehensive, and theoretically enabled a dental officer to set up a dental surgery anywhere in the field. In practice, however, dental officers found themselves at the mercy of circumstances and the station commander so far as accommodation was concerned. This was unsatisfactory, because unless a suitable environment is provided dentistry can easily become a sordid and unpleasant business, bad for morale, and having unfortunate psychological repercussions on patient and operator alike.

It was decided therefore to convert a number of week-end type trailer caravans into mobile dental surgeries, and these vehicles proved invaluable on the home front. They were not sufficiently robust for war-time service abroad, however, although a few were shipped to the Middle East as an interim measure until more suitable vehicles could be supplied and equipped.

Pending arrival of the improved mobile surgeries from the United Kingdom and to augment the trailers already received, the Principal Dental Officer in the Middle East arranged for the local conversion of vehicles similar to the Service ambulance for use as improvised dental surgeries. A prototype was designed and built in R.A.F. workshops in Cairo. Adequate provision was made for lighting, interior fittings, cupboards, and shelves. A water tank was also installed. Having completed the prototype, further vehicles were converted and eventually, by the time the Alamein offensive developed, all the principal units of the Desert Air Force were served by dental officers each of whom had his own mobile surgery.

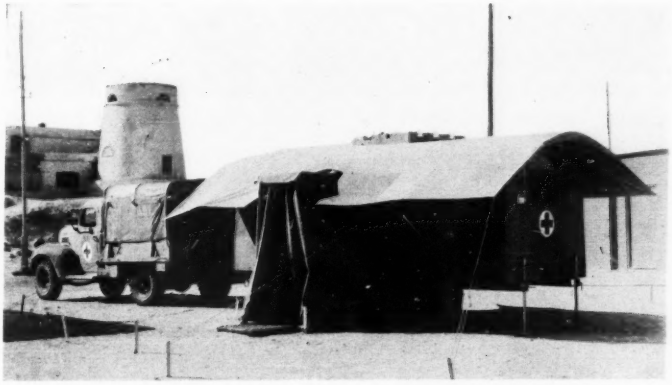


Fig. 1.—Mobile dental surgery, North Africa, 1943.

At the same time a few lorries were fitted out as mobile dental laboratories, so that each surgery was catered for by a laboratory and

denture work could thus be processed with minimum delay.

When the long advance to Tunis was in progress, dental officers were able to keep up with the squadrons and to carry out treatment within a very short time of reaching a new location. This means of providing dental treatment for a mobile operational Air Force proved to be so successful that when the landings in Sicily, Italy, and France took place the dental officer with his mobile unit was regarded as essential to the invading force.

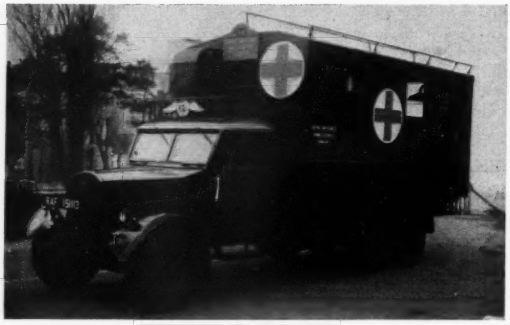


Fig. 2.—Mobile dental surgery (prime mover).

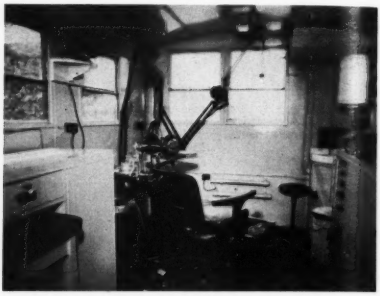


Fig. 3.—Interior of mobile dental surgery.

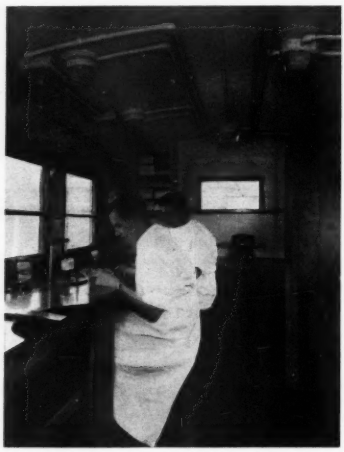


Fig. 4.—Interior of mobile dental laboratory.

Dental officers regarded it as a privilege to serve in these mobile units and much could be written of the personal interest they took in their vehicles and the ingenious contraptions they devised to improve them. One officer procured a "Wimpey" pilot's seat which he converted into a dental chair by welding a hydraulic jack to the base and adding a foot pedal attachment; an operating stool was made out of a 1000-lb. German bomb tail unit; an engine oil-pump motor was converted into a dental engine; and a sink and tiles were obtained from the ruins of Benghazi.

Meanwhile, at home, dental vehicles of the prime mover type (i.e., self-propelled) were being built and were ready for operation in Europe with the Second Tactical Air Force. The first mobile dental surgery and mobile laboratory attached to No. 50 Mobile Field Hospital was landed on the Continent on D Day + 7 and was fully functional by the following afternoon. The dimensions of the bodies of these new vehicles were sufficient to carry complete dental equipment as used in static surgeries, such as pump chair, fountain spittoon, electric engine, gas apparatus, etc. Heating and lighting were wired for plugging into the mains when available and an alternative circuit was installed for use with the accumulators provided.

Throughout the war and since, the gradual evolution of these vehicles has proceeded, and they have now attained a degree of comfort and efficiency that has revolutionized dentistry in the field.

In addition to the mobile dental surgeries already described, the Royal Air Force also provides a fleet of mobile dental hygiene clinics

which, staffed by one or two dental hygienists, spread the gospel of oral hygiene up and down the country.

In commands at home the whole mobile dental contingent, except for the hygiene units, operates under one centralized control, which is responsible for itineraries, time schedules, maintenance, and repairs, etc.

The arrival of these travelling surgeries is much appreciated by the small units they visit, and there is a rush for dental treatment. Unfortunately it is seldom that the itinerant dental officer can complete all the treatment required. He does his best in the time allotted before proceeding on his way, with a promise to be back in six months' time.

TRAINING IN THE DENTAL BRANCH OF THE ROYAL AIR FORCE

By **Wing Commander ROY SCOGGINS, L.D.S.**

Recently Commanding Officer, Dental Training Establishment

WHEN considering training in the Dental Branch of the present-day Royal Air Force it is noticeable how different the task is now from what it was in the days prior to 1939. The R.A.F. of those days was manned with personnel who were serving on comparatively long engagements, whereas to-day, apart from being much bigger, a large proportion of its personnel serve for no longer than the two years prescribed under the National Service Act. In addition, to obtain its regular personnel it now has to compete in a labour market in which there is full employment. The combination of these changed conditions has resulted in training assuming a far greater importance than ever before.

Fig. 1.—Royal Air Force Dental Training Establishment (Dental Hygiene Clinic).

In order to attract the right type of regular into the Service, and in order to make the utmost use of the National Service man, it has been found necessary to review the training

methods in use hitherto so as to assist in the achievement of both objects. The Services to-day are very complex organizations requiring varying degrees of skill from their members. Some tasks require a high degree of technical ability which can only be obtained after a lengthy period of training, and consequently these, in most cases, have to be carried out by regular personnel. Other skills are more readily acquired, and for these the National Service man is eminently suited. The Dental Branch requires a combination of these varying skills—thus the requirements for a dental mechanic and a dental hygienist are such as necessitate comparatively lengthy courses of training, whereas those for a dental surgery attendant are much less exacting, thereby requiring a far shorter period of instruction. It is because of this that it is not practicable to train the National Service man in either of the former two trades.

Fig. 2.—R.A.F. dental mechanics under training.

As the National Service man has a period of two years only in which to be trained and to give productive service it is of considerable importance that the time spent in training him should be as short as is consistent with efficiency. With this object in view instructional syllabuses have been drawn up so that no time is devoted to subjects which have little practical application in the actual carrying out of the jobs that he will have to do. As a consequence, the time spent in training dental surgery attendants has been reduced by more than half compared with pre-war days. More emphasis is now placed on fitting the airman or airwoman to be a competent chairside assistant and less attention is paid to the more theoretical background subjects, the importance of which is not readily apparent when carrying out the day-to-day tasks in the surgery.

The R.A.F., in common with the other Services, cannot remain an efficient organization unless it contains a large nucleus of highly trained personnel serving on long-term engagements. The problem of attracting these personnel in the post-war labour market has been tackled with energy, and the outcome has been the introduction of the New Trade Structure. This has been drawn up so as to give all regulars the choice of a great variety of different forms of training, many of which have a definite financial value in civilian life, and it also provides facilities for the acquisition of more highly technical skills as service progresses. In addition a highly skilled tradesman can now advance irrespective of establishment vacancies and dependent only on his ability, subject to certain time qualifications. This has necessitated a revision of training programmes and in most trades to-day regular airmen and airwomen undergo an initial course of instruction to give them the basic qualifications for their job and then later as their service progresses they have the benefit of an advanced course which brings their technical ability to a high

level and provides the opportunity for further advancement dependent on their ability as tradesmen.

The trade of dental mechanic provides a good example of the success of this policy in attracting recruits from civilian life, though it is as yet too early to assess how many of them will remain in the service when their initial engagements expire. Before the war the R.A.F. had no need to train dental mechanics as sufficient fully trained craftsmen could be obtained from civilian life. Since the war, however, the situation has been vastly different, and the claims of the National Health Service have been such as to reduce the intake of trained mechanics to negligible dimensions. Consequently, it has been necessary to institute a course of training so as to transform recruits, who in some cases have had no previous experience of the trade, into highly skilled dental mechanics. This is a trade which has definite value in civilian life and, because of it, there have been considerably more applicants for training than there have been vacancies. In this particular type of basic training, that given by the Service has much to commend it when compared with that undergone by the majority of trainees in civilian life. The former extends over a period of two years and during this time continuous organized instruction is given. The trainee progresses steadily from the routine of casting models and making bite blocks to the more intricate tasks of setting-up and processing dentures. Then, when these tasks have been mastered, a considerable period is devoted to the various forms of metal work. Throughout, the main emphasis is placed on giving the trainee as much experience as possible in all the many aspects of his trade. Practice is given, of course, on actual jobs, but at no time is the tempo of training dictated by the pressure of work on hand.

The R.A.F. to-day places considerable importance on there being as close a correlation as possible between its varying types of training and their counterparts, where they exist, in civilian life. By so doing personnel are enabled and encouraged to obtain civilian qualifications, thereby enhancing their professional status. In the case of dental mechanics and dental hygienists this principle has been borne in mind when drawing up the syllabuses of training, and close co-ordination in this matter has been achieved with both the City and Guilds and the Ministry of Health.

It must be remembered that although the work of personnel in the Dental Branch requires in the main a practical manual dexterity, there is none the less a background of Service knowledge which is vitally necessary if they are to carry out their duties in the most efficient manner. Thus a good dental surgeon will not automatically be transformed into a good R.A.F. dental officer unless he acquires a knowledge of Service customs and procedure. There are, therefore, two aspects of the training of dental personnel: The first is concerned with making them good officers, airmen, and airwomen, thereby becoming imbued, both in their general bearing and in the manner in which they carry out their work, with a genuine pride in their Service; the second is connected with imparting knowledge of their actual day-to-day job in the surgery or laboratory. Both aspects are regarded as being of fundamental importance and they are integrated as far as possible so as to ensure that the training is not carried out in watertight compartments.

PREVIEW

The following articles are among those to be presented in our pages early in the New Year.

Orthodontic Springs for Removable Appliances
J. S. Beresford, B.D.S., H.D.D. R.C.S. Edin.

The Third Dentition
A. C. Coxon, L.D.S. R.C.S. Eng., B.Chir., M.B., M.R.C.S., L.R.C.P.

An Outline of Clinical Parodontics
S. F. Fish, L.D.S. R.C.S. Eng.

The Removal of Retained Roots
D. M. MacDonald, F.R.C.S. Edin., F.R.F.P.S., L.D.S.

Report of a Case of Pathological Gemination
E. J. Perint, M.D., D.D.S., L.D.S. R.C.S. Eng.

The Age Factor in Orthodontic Treatment
W. J. Tulley, L.D.S. R.C.S. Eng., B.D.S.

THE WORK OF THE DENTAL HYGIENIST

By **Squadron Leader G. W. CLOUTMAN**, L.D.S.

Senior Instructor, Dental Training Establishment

THE usefulness of the dental hygienist is a subject which may be of interest to readers and in particular to those who have not had the opportunity of first-hand experience in working with these ancillaries.

It is proposed to relate this description mainly to the work of the hygienist in more or less advanced cases of periodontal disease,

Fig. 1.—W.R.A.F. dental hygienist under training.

although passing reference will also be made to their more comprehensive sphere of activity.

The importance attached to what is written may vary to some extent between individual readers, this variation depending upon the emphasis on one or other factor in the aetiology of periodontal disease which the individual accepts. If, for example, the belief is held that functional disharmony, endocrine disorders, or other endogenous factors are the initial or prime causes, then the extent and quality of the hygienist's work will be of less consequence. If, on the other hand, oral hygiene—or rather its neglect—is held responsible in a majority of cases, the usefulness of the hygienist cannot be over-estimated.

Marginal irritation of the gingivæ by the accumulation of various deposits upon the teeth has been recognized as among the most important factors in the incidence of periodontal disease for many years. It is interesting to trace what has been written on this subject at widely separated intervals in the history of dental science. The authors quoted had not, in the earlier instances, the advantages of modern histological findings, nor were they specialists in the sense that periodontia is now accepted as a speciality. Their observations were doubtless largely based upon empirical experience.

The earliest is the inimitable Pierre Fauchard, who in 1746 wrote of disease of the gums—"the cause of this is most commonly tartar which accumulates on the teeth and insinuates between them and the gums, which gives rise to compression of the vessels and obstruction to the passage of fluids". In 1821–1822 Leonard Koecker and Horace Hayden stated, "The presence of calculus on the affected teeth and general uncleanliness of the mouth were observed as common but not inseparable accompaniments [of periodontal disease]".

In a book originally published in 1921, J. B. Parfitt wrote: "Whatever other causes of gingivitis there may be, the presence of tartar under the free margins of the gums is certainly one of them, and it is idle to expect a complete cure unless the tartar is completely removed".

The practical application of this concurrence of view is the main purpose of the dental hygienist's work. It may be summed up in two quotations from Bunting's *Oral Hygiene and Preventive Dentistry*. Concluding the section on the aetiology of gingivitis, Hamilton B. G. Robinson says, "In the final analysis, calculus is the most important single factor in gingivitis"; and Dorothy G. Hard defines oral prophylaxis as embracing "all methods by which the various harmful influences may be removed from the dental and periodontal tissues, and these tissues left in such a condition that oral cleanliness and oral health may be continuously maintained".

It is hoped, on the basis of this definition, to describe the full scope of work of the dental hygienist and in particular the ways in which notably time-consuming phases of periodontal treatment may be delegated to her.

The hygienist's work consists chiefly of:—

a. The removal of all supragingival and subgingival deposits from the teeth.

b. The polishing and burnishing of all exposed tooth surfaces.

c. The irrigation and hygienation of mouths in which the use of antiseptic or astringent substances is considered an effective part of treatment.

d. The institution of interstitial cleansing and friction of the gum tissue, in which she instructs her patient.

e. The individual education of patients in the importance of oral health in relation to the body as a whole.

f. Assisting her Principal in routine examination, including radiography, to ensure the maintenance of an improved condition.

It must be submitted that whereas the study of causes of disease of the tissues by which the teeth are attached, together with the pathological changes involved, have been given due attention in the past, the detail of treatment has, until comparatively recent times, been dealt with all too briefly. The operation of scaling, the basis of all such treatment, has probably been the one most neglected.

In the fourth volume of *Operative Dentistry*, by G. V. Black, the following appears, and may be taken as a partial explanation: "The removal of salivary calculus seems to have been regarded as a thankless and disagreeable operation from far back in the history of dentistry. This has been from two causes. First, dentists have had no real confidence in the efficacy of the operation for more than a very temporary benefit; second, the practicability of preventing a recurrence of the deposit by proper brushing was not sufficiently well established".

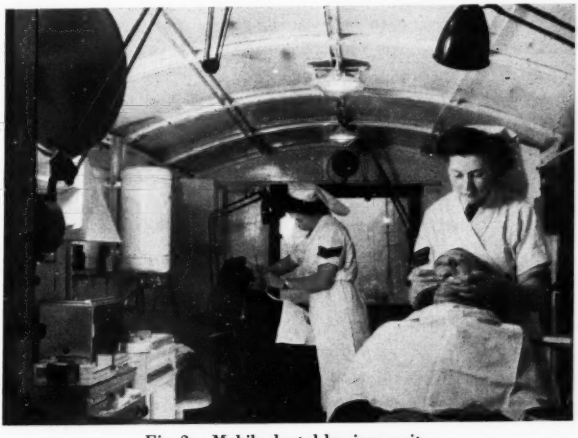


Fig. 2.—Mobile dental hygiene unit.

The hygienist is taught the *art* of scaling—as far as it is possible to teach an art. A relatively small range of instruments, a well-defined system of grasps, finger-rests, and instrument-movement, and the division of the mouth into segments or quadrants to be dealt with in a certain order, produce a methodical approach to the operation. This contrasts sharply with the relegation of scaling to a last-minute hurried procedure—a state of affairs dictated by circumstances in many busy practices. She is taught that routine oral hygiene treatments should be carried out in three or if necessary more visits of twenty to forty minutes each, and that the more difficult case should not be bound by any time limit, but must be pursued as in other cases until the

most searching subgingival exploration reveals no trace of deposit.

The role of this ancillary can be extended to great advantage in the department of the hospital dental officer. Full oral hygiene treatment for all patients, other than emergency cases, should in the view of increasing numbers of surgeons become part of routine preparation for general anæsthesia. Thereby, it is believed that the isolated but unfortunate instances of complications involving the respiratory organs could be avoided. The hygienist can also do much which may be beyond the scope of general nursing to relieve the discomfort of patients in wards by attending once or twice daily to cleanse and irrigate their mouths.

This function will be especially valuable in cases of injuries to the face and jaws: preparation of the mouth for the application of splints, and subsequent cleaning when the appliance has been removed can be carried out by the hygienist.

The word "delegate" has earlier been used in connexion with the transference of oral hygiene treatment by the dentist to the hygienist. From this may be inferred some idea of the task being one of lesser importance than the other phases of treatment to be given. The very reverse is surely true.

Surgical procedures in the presence of adherent masses of calculus are fraught with danger: elaborate conservations of teeth the attachments of which are threatened by the early stages of periodontal disease are futile; a partial prosthetic appliance fitted in a mouth of poor oral hygiene surely does no more than guarantee the necessity of a full denture in the relatively near future. This is the beginning and ending of all planned dental treatment.

In order more amply to illustrate the role of the hygienist in the treatment of periodontal disease, the distribution of various tasks will now be described.

Two representative cases will be considered.

1. In the first, the dentist decides upon radical treatment.

The hygienist prepares the mouth, taking precaution against the detachment of calculus when forceps or elevators are applied. If the case is one of considerable severity, the chronic inflammatory state may be appreciably reduced by two visits and an interval of one week or so prior to extraction. This routine, together with the use of prophylactic penicillin, minimizes the dangers of bacteriæmia set up by manipulation of the periodontally involved teeth.

Thereafter, the patient may require instruction in post-operative care, which can again be given by the hygienist.

2. In the second case, where the decision is for conservation of the teeth, the hygienist's part is larger.

It is submitted that two factors are essential for success in these cases. These are:—

a. A clear picture of all factors concerned in the cause, so that they can be dealt with in appropriate order and be completely eliminated; and

b. The full co-operation of the patient, whose diligence in after-care is of equal importance to the work to be carried out at the chair-side.

The state of the mouth at the outset should first be recorded in detail. The depth of pocketing about various aspects of the teeth is estimated with a suitably calibrated probe, and intra-oral films are taken as an initial observation of the extent and direction of destruction of alveolar bone. At the same time the hygienist can assist in diagnosis and the planning of treatment by ascertaining contributory causes such as dietary habit, biting habit, etc.

Removal of all supragingival and subgingival deposits which can be detected by sight or touch follows. The teeth are brush-polished and burnished by hand with pointed and wedge-shaped orange-wood sticks and a mildly abrasive paste. This phase of treatment occupying three or if necessary more visits may be left entirely to the experienced hygienist, and at their conclusion the method for pocket elimination can be decided by the dentist.

In some cases it is obviously expedient to carry out gingivectomy before the subgingival scaling is completed, but in a proportion the oral hygiene measures accompanied by antiseptic lavage and astringent application obviate the necessity of the removal of gum

tissue in all but the most seriously involved teeth.

Post-operative cleansing is now undertaken by the hygienist, and the dentist will correct any appreciable occlusal irregularities giving rise to suspicion of masticatory trauma as a factor in the periodontal breakdown. Occlusal equilibration will obviously, in some instances, be commenced at an earlier stage. The immobilization of teeth showing tendencies to splay, separate, or wander will follow.

During the foregoing visits, the hygienist will have used a proportion of her time in explaining to the patient the essential role of adequate after-care to follow up the more or less comprehensive periodontal treatment he has undergone. The following points should be included:—

a. The inflammation of the gum tissue has led to pocketing, initially by thickening of the margin and later by loss of the attachment of gum tissue to the tooth surface. Some recession has set in accompanied by reduction of the interdental papillæ. (The hygienist is equipped with models to show and contrast the normal with the abnormal.)

b. The efficacy of self-cleansing by mutual action of the teeth, the lips, cheeks, and tongue is therefore no longer to be depended upon.

c. Cleansing methods of a more thorough nature and involving more time than had hitherto been devoted must therefore become the patient's habit.

d. The maintenance of the renewed health of the gum tissue depends upon this cleanliness—that is the avoidance of accumulations hard or soft near the margins—and upon the gum being stimulated by more or less constant friction.

e. In view of the altered gum contour this friction will have to be applied artificially.

f. Frictioning and cleansing methods may include:—

i. A correct technique of mouth-brushing. In this connexion, the hygienist will advise on the best available pattern and material of mouth-brush available, the way the brush should be used, the times and duration of brushing, and the care of the brush.

ii. The use of a simple irrigator or hygienator to clear the spaces under the contact areas. This may be accomplished in most cases by vigorous mouth-washing.

iii. The clearance of faulty (insufficiently firm) contact areas with floss-silk.

iv. The use of the mouth-brush not only to cleanse the exposed tooth surfaces but to stimulate the gum tissue. (The alternate blanching and blushing of the gum on application of the brush should be demonstrated to the patient with the aid of a hand mirror.)

v. The use of wood points or rubber stimulators on the more or less flattened interdental papillæ.

vi. The application of firm digital massage to the broader labial, buccal, and lingual gum surfaces.

Some or all of these techniques are explained in detail. Dangers, as in incorrect use of floss-silk, are pointed out. The chief responsibility for persuading the patient rests with the hygienist. Whereas a proportion of patients will be half-hearted in these procedures or indifferent to the advice (in which case it will be well to avoid conservative methods), an encouraging number are found who manage to fit the extra five or so minutes required into their routine. In these ways the "very temporary benefit" referred to by G. V. Black may be made more nearly permanent.

From what has been written, it will be gathered that in addition to her practical training, to which reference has been made, the hygienist must be given as clear a picture as possible, from the theoretical standpoint, of the pathology of periodontal disease. Although she has no part strictly speaking in diagnosis and determining lines of treatment, it will be insufficient for her to be merely skilled in the operation of scaling and polishing.

The training of hygienists is directed to their understanding of the structure and function of the dental and periodontal tissues in health, and the proliferative or degenerative changes and the consequent impairment of function in various forms of disease. She can therefore be of considerable assistance in the observation of cases as well as in their treatment.

NATIONAL HEALTH SERVICE NOTES

General Dental Services

Dentists Bill: Main Provisions

The text of the Dentists Bill, which was introduced in the House of Lords on Tuesday, Nov. 27, 1951, has been published.

The Bill has two main objects: (1) To establish an independent General Dental Council, thus giving the dental profession self-government; (2) To give a recognized status to ancillary dental workers and to provide for training, as an experiment, of one type of ancillary dental worker who, under the supervision of qualified dentists, would extract and fill teeth. After training, the workers of this type would then be employed for a trial period before any decision was made to give them permanent recognition.

Other provisions of the Bill are:—

A simpler procedure for admitting foreign-trained dentists to the British register.

The right of lay persons to carry on the business of dentistry through the employment of registered dentists would be restricted.

To provide disciplinary machinery and procedure for the dental profession on similar lines to those laid down in the Medical Act, 1950, for the medical profession.

The provisions of the Bill relate to Scotland and Northern Ireland as well as to England and Wales.

Remaking of Dentures

The Minister of Health has made the following decision in regard to the remaking of dentures in relation to the provisions of the National Health Service Act, 1951.

The Minister has been advised that, if a dentist merely alters a denture, e.g., by relining or adding a tooth, without breaking down the main structure of the old denture, he does not supply or replace a denture. Where, however, the dentist breaks down the old denture for the purpose of remaking, what is supplied is a replacement, if not a supply; and dentists will be aware that a replacement (except a replacement necessitated by loss or damage), is required to be treated as the supply of a new denture for the purpose of the National Health Service Act, 1951. The Minister therefore takes the view that the remaking of dentures is subject to the provisions of the National Health Service Act, 1951. He understands that the Dental Estimates Board will treat estimates for remaking dentures accordingly.

New Superannuation Leaflet

The Ministry of Health has prepared a new leaflet (SDK) dealing with superannuation for the information of persons who leave National Health Service employment. It explains the various courses open to them regarding superannuation. Copies of the leaflet have been issued to employers in the National Health Service to give them a ready means of dealing with similar questions from employees. The Ministry has suggested that copies should be placed on notice boards and in staff common rooms, and that any officer who may be leaving the Service should be able to borrow a copy.

"Help Your Teeth Help You"

"Take care of your teeth—and your teeth will take care of you." This is the slogan embodied by the Ministry of Health in the latest addition to its series of pictorial display sets on health subjects.

Devoted to dental care, the set emphasizes three simple rules for healthy teeth: (1) Eat the right food; (2) Clean the teeth properly; (3) Visit the dentist regularly.

The correct way of brushing the outer and inner surfaces of the teeth is demonstrated.

The display set, consisting of twelve pictorial and letterpress panels printed in colours, has been produced for the Ministry by the Central Office of Information. Copies of these sets are still available to Hospital Management Committees and Local Health Authorities, and applications should be sent direct to the Central Office of Information, Room 2304, 83 Baker Street, London, W.1.

PARLIAMENTARY NEWS

Questions and Answers

NATIONAL ASSISTANCE FOR DENTAL PATIENTS

Mr. Bartley (Lab., Chester-le-Street) asked the Minister of National Insurance if he was aware that, contrary to the understanding given in the debate on the second reading of the National Health Service Act, 1951, aged pensioners who are in receipt of a supplementary pension from the National Assistance Board, and who require to be provided with spectacles or dentures, are being refused assistance from the Board to enable them to pay the charge for such spectacles or dentures; and what steps he is taking to see that the intentions of Parliament in this respect are carried out.

Mr. Osbert Peake, in a written reply, said: The Board inform me that these cases are dealt with on the same basis as other requests for single payments. I do not think this conflicts with anything said during the debate. (*M., Dec.* 3.)

Mr. Baird (Lab., Wolverhampton, N.E.) asked the Minister of National Insurance if he would state the number of dental patients requiring dentures who had applied for financial aid to the National Assistance Board; and the number to whom aid had been granted.

Mr. Osbert Peake, in a written reply, said: Up to the end of October, 1951, 17,650 applications had been received, 6040 grants had been made, and 3015 applications had been refused or withdrawn. The remaining 8595 cases were either awaiting decision or a grant on completion of the dentures. (*Th., Dec.* 6.)

DENTAL BOARD OF THE UNITED KINGDOM

CATALOGUE OF FILMS IN THE LIBRARY

AT the instigation of the Dental Board the use of films in undergraduate and postgraduate dental education has been examined closely. There was evidence of the increasing importance being attached to visual education in all branches of education and, while it was known that a number of films of interest to the dental profession had been made privately, there was no organization or catalogue to which reference could be made showing what films in fact existed, nor could it be expected that anyone who had gone to the trouble and expense of making a film would allow it to be used widely, especially as in most cases only one copy was in existence.

It was considered that there was a real need for a single organization, which would be recognized as the central source of information on the subject, to undertake the classification of all films of value in dental education. In order to avoid an overlapping or duplication of effort among the various bodies which might have explored this field, a conference of interested parties was convened and this led directly to the formation by the Dental Board of an advisory committee to undertake this work.

This committee, under the chairmanship of Professor Herbert, of Guy's Hospital Dental School, has collected information, viewed and assessed over one hundred films, and also explored fully the possibility of the establishment of a dental film library. As a result of its report to the Dental Board, funds were placed at the disposal of the committee for the making of copies of those films which in the opinion of the committee were of value for teaching purposes and which were not available for general distribution. A careful selection of films has been made and with the support of the Dental Board the nucleus of a central dental film library has been formed.

The question of adding sound commentaries to the silent films was considered, but

had to be abandoned on account of expense and the limited funds available to the committee, and as an alternative scripts have been produced which can be read either before or during a performance.

In order that the library shall be self-supporting and have funds with which to replace worn copies, it has been necessary to impose a charge for the hire of films.

Application for the hire of films should be made to The Director of the Dental Postgraduate Bureau, 44, Hallam Street, London, W.1.

DETAILS OF FILMS

Films on Acrylics

AC.1.—*Acrylic Jacket Crown Technique* (Royal Air Force—1945); 60 minutes; 16 mm.; colour; sound; hire charge £2.

This is a technical film which shows in detail each stage in the preparation, construction and fitting of an acrylic jacket crown on vital and non-vital teeth. Technique of construction has since been improved by better methods. Each stage of the preparation in the mouth is also demonstrated on a large plaster model of the tooth.

Films on Anæsthesia

AN.1.—*Anæsthesia in the Dental Chair* (*Adults*); 20 minutes; 16 mm.; monochrome; sound; hire charge £1.

This film first shows, in detail, the procedure with a normal patient when nitrous oxide is used: examination and preparation—induction—insertion of the throat pack—variation of the setting of the mixture—stance of anæsthetist during extractions—recovery. The application of a mouth cover, for persistent mouth breathing is also shown.

The film then explains the effect of wrong position of the patient in the dental chair, the use of a Mason's gag, and then the unreliability of relaxed limbs, dilated pupils or cyanosis, as signs of anæsthesia. Jactitation is also shown.

Dealing next with difficult cases, the film illustrates technique in the case of a patient with trismus. For a resistant patient the use of trilene or vinesthene as an adjuvent to nitrous oxide is shown on the Walton machine. Another such patient is given a sedative and subsequently shows diminished reflex excitability. There are patients who still will not tolerate the nose-piece; for one of these anæsthesia is induced with minimal thiopentone in the chair.

Finally the portable equipment necessary for giving anæsthesia to any type of patient in a dental surgery is shown in detail.

AN.2.—*Anæsthesia in the Dental Chair* (*Children*); 10 minutes; 16 mm.; monochrome; sound; hire charge 10s.

This film shows the technique of inducing nitrous oxide, ethyl chloride and divinyl ether anæsthesia in children.

After describing ways of reassuring the child and achieving co-operation, the film explains the difficulty of maintaining an even level of anæsthesia with nitrous oxide and how the child's return to consciousness may be free from disturbance. The importance of sedatives for the very nervous child is then stressed.

The technique of nitrous oxide and ethyl chloride anæsthesia is explained, and the appearance of the child thus anæsthetized is described. We are shown what to do if the child cries during induction, if a breath is missed and if laryngeal spasm develops.

Finally, the use of divinyl ether in the Oxford inhaler is demonstrated; how to judge the duration of anæsthesia and to prevent oxygen lack from continued breathing.

The film emphasizes that in giving a child its first experience of anæsthesia the anæsthetist assumes a great responsibility.

N.B. Both these films and others on anæsthesia are available without charge from the I.C.I. Film Library, Bolton House, Curzon Street, London, W.1.

[*This catalogue of films will be continued in our February issue.*]

NEWTON HEATH TECHNICAL COLLEGE
Dental Technicians Courses

A series of special lectures and demonstrations will be presented by Imperial Chemical Industries Ltd. on Wednesdays at 7 p.m. at the Newton Heath Technical College, Newton Heath, Manchester, 10.

Jan. 23, 1952.—The Use of Methyl Methacrylate for Denture Base. Mr. R. E. Wright.

March 12, 1952.—The Preparation of Artificial Teeth and Crowns from Methyl Methacrylate Powders. Mr. R. E. Wright.

April 30, 1952.—Summary of Methyl Methacrylate in Dentistry, referring to Denture Base, Points of Processing Teeth and Base, the Use of Methyl Methacrylate for the Preparation of Eyes and other Prosthesis. Mr. R. E. Wright.

These lectures are free and open to all employed in Dentistry.

INSTITUTE OF BRITISH SURGICAL TECHNICIANS (INC.)

A lecture on Crown and Bridge Work will be given by Mr. R. V. P. Campbell, H.D.D., L.D.S., under the auspices of the Institute of British Surgical Technicians (Dental Section) on Tuesday, February 12, 1952, at 6.30 p.m., at the Eastman Dental Hospital, Gray's Inn Road, London, W.C.1.

Admission tickets are obtainable on sending stamped addressed envelope to the Institute of British Surgical Technicians, 6, Holborn Viaduct, London, E.C.1., or through members. Further lectures are being arranged.

ILLUSTRATED HINTS

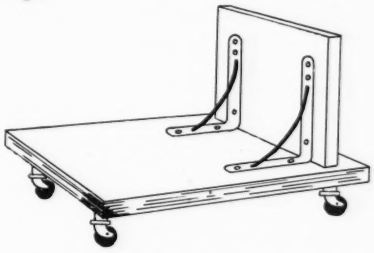
A USEFUL TROLLEY

In a busy laboratory time and energy can be reduced by using the simple trolley illustrated, on which the large heavy sacks of plaster can be readily moved from storeroom to bench, etc., and bins of waste plaster taken away.

Details of construction are as follows: Materials—One piece of wood 1 ft. 8 in. by 1 ft. by 1 in. in thickness to form the base. One piece of wood 1 ft. by 8 in. by $\frac{3}{4}$ in. to form the upright which supports the plaster sack. This upright is fastened to the base by two 10 in. by 8 in. brackets.

At the four corners of the base steel castors are affixed.

The cost of construction is about five shillings. S. W. J.

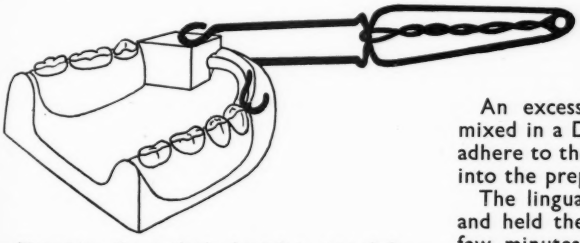


REPLACEMENT OF CLASP USING AN ISOTHERMAL RESIN WITHOUT FLASKING

A Class I (Kennedy) partial lower denture with wrought wire clasps and lingual bar in stainless steel was received for repair.

The acrylic saddles carried $\overline{7}\overline{6}\overline{5}\overline{4}|4567$ acrylic teeth. The clasps around $\overline{3}|\overline{3}$ were carried on to the cingula of $\overline{2}|\overline{2}$ to act as indirect retainers.

The tags had been soldered to the body of the clasps with silver solder. The joint of the clasp on $|\overline{3}$ had been inadequately soldered, with the consequence that the half-round wire had become detached from its tag and from the denture.



Illustrating the method adopted to give slight continuous pressure on the matrix.

Technique Adopted.—The clasp was fitted back into its correct position and securely waxed. A model was cast in plaster. When initially set, a small lingual matrix was poured in plaster incorporating as much of the clasp as possible, extending posteriorly as far as $|\overline{5}$. When thoroughly hard the matrix and wire were removed and the repair area was prepared.

The embedded tag was uncovered, removed, and a retentive channel cut with a No. 10 inverted cone bur. Half an inch of No. 7 stainless steel half-round wire was cut and well roughened with a $\frac{3}{8}$-in. knife-edge carborundum stone in the handpiece.

This new tag was approximately contoured to fit the prepared channel and the angle formed with the clasp noted. The joint was then spot-welded, ground, and the assembly fitted accurately to model and denture.

An excess of pink self-curing resin was mixed in a Dappen glass. When it ceased to adhere to the sides of the glass it was packed into the prepared area.

The lingual matrix was placed in position and held there under thumb pressure for a few minutes. Pressure was continued for a further ten minutes by means of a pair of D.M.C. spring-loaded soldering tweezers.

The material was fully cured (room temperature was 65° F.) and when finished and polished no porosity was apparent. Colour harmony was adequately maintained.

Advantages of the method are: rapidity of technique; convenience to patient who has not long to wait; and freedom from warpage or dimensional instability, which is always a possibility with thermal recuring. E. A. S.

BOOK REVIEW

ANÆSTHESIA IN DENTAL SURGERY. By STERLING V. MEAD, D.D.S., M.S., B.S., F.A.C.D. Second edition. $6\frac{5}{8} \times 9\frac{5}{8}$ in. Pp. 648, with 212 illustrations. 1951. London: Henry Kimpton. 88s.

KNOWLEDGE of anæsthesia, whether local or general, is the best way of alleviating pain in operative dentistry. One must have a thorough knowledge of all the factors involved in selecting and administering a particular anæsthetic. This book is divided into three parts, and deals comprehensively with anæsthesia in dental surgery. The first part deals with the selection of anæsthesia, analgesia and anæsthesia for various dental operations, and teaching and research in general anæsthesia. The second part deals with the history of local anæsthesia, anatomy, types of local anæsthesia, pre-operative preparation and medications for local anæsthesia, local anæsthetic solutions, armamentarium for local anæsthesia, methods of producing anæsthesia, complications and accidents of local anæsthesia, and post-operative treatment. Part three deals with the history of general anæsthesia, physiology in relation to general anæsthesia, pre-operative preparation and medication for general anæsthesia, intravenous, rectal, and inhalation anæsthesia, muscular relaxation, unfavourable reactions and complications, emergency measures, resuscitation, and post-operative care. The dental surgeon himself may not be giving general anæsthesia for a prolonged dental operation, but it will be to his advantage to know all about the particular technique that his anæsthetist is going to use, and to be able to discuss with him its pros and cons.

The book is well printed, diagrams and photographs are clearly executed and well reproduced, and the text is a masterly exposition of the subject that only an expert such as the author could write, and is of use for the student as well as practitioners, both dental and medical.

A few typographical errors and controversial statements could well be omitted or re-written for the next edition; as, for example, on page 71, the last paragraph on "Hospitals" could be amended, suggesting that it is possible to do this type of work in hospitals equipped with modern surgeries and staffed with experienced operators. These are only minor points which should not distract readers from perusing this very useful manual and assimilating a wealth of information on the very important subject of anæsthesia in dental surgery.

H. M.

ABSTRACTS *from Other Journals*

Tungsten Carbide and its Application to the Dental Bur

This paper is the first of a series which is to be produced by the University of Birmingham on the development of tungsten carbide for the cutting heads of dental burs.

A short but interesting history of the dental bur concludes with the statement that the final mass production of dental burs led to a retrograde step in their manufacture. In normal engineering practice all steel cutting tools are ground and/or lapped after hardening. This procedure was taken in the early hand-made burs, but the change to cutting and milling on automatic machines has made the steel dental bur the only cutting instrument which is neither ground nor lapped after hardening. This causes the edges to roll back, but even with a hardening process given to the steel by the salt bath the edges will tend to crumble as soon as they come into contact with a substance as hard as the enamel of a tooth. But the main cause of inefficiency in the steel bur is the mere fact that enamel is a material that is too tough to be cut by steel. A harder substance is required to perform the operation with efficiency. Diamond, operating by "grinding" as distinct from "cutting", is

much more efficient but requires a very high speed for maximum efficiency.

A short discussion is given on the production of tungsten carbide by the process of powder metallurgy. The article then proceeds to deal with the efficiency and design of the dental bur with this material.

It was first found that only the hardest of tungsten carbide could be used for cutting enamel. The early type of bur from this material was designed as the normal steel bur, but the blades were liable to chip as soon as they came into contact with enamel. This chipping of the blades limited the widespread use of the early tungsten carbide burs. The main problem of tungsten carbide bur design is, then, to strengthen the blades beyond the point when chipping will occur and at the same time to maintain adequate clearances between the blades. Using engineering principles this special design was produced by reducing the number of blades to six with one side of the blade curved. With this reduction it was thought that the amount of vibration would be increased but with the final design this has been found to be at its minimum. Clinical tests on these burs have been carried out by private practitioners who reported that in all respects the burs made of tungsten carbide were superior to the normal steel ones. The authors claim that the use of tungsten carbide for the manufacture of dental burs is a major development in dentistry. It may lead to considerable advances in the technique of cavity preparation in terms of speed of working, efficiency of cutting, and an appreciable reduction in pain and unfavourable pulp reactions.—OSBORNE, J., ANDERSON, J. N., and LAMMIE, G. A. (1951), *Brit. dent. J.*, **90**, 229.

Zinc Chloride in Ulceromembranous Stomatitis

The author reports good results obtained in the treatment of Vincent's stomatitis by using locally concentrated solutions of chlorides. The disadvantages of penicillin and chromic acid are discussed. Instead of using a simple aqueous solution of zinc chloride which may be painful in this application, a more complex formula has been devised. This formula is given as:—

Zinc chloride	33·33 gr.
Amylocaine hydrochloride ..	10 gr.
Ammonium chloride	6·5 gr.
Menthol	2 gr.
Sodium sulphoricinate	5 gr.
Distilled water	10 gr.
Alcohol .. .. to complete	100 gr.

—FERREIRA, L. (1951), *J. Luso-Espanholas Estomatol.*

Correction

Messrs. L. Porro Ltd. have informed us that they are stockists but not manufacturers of Exner pattern elevators, and that they are not the agents for the Busch Company, as erroneously stated in our November issue (p. 80).

Continued from p. 154]

Mr. Christenson, in opening the discussion, maintained that there are more functional causes in periodontal disturbances than Dr. Fish indicated, and that one often finds recurrence of lesions following gingivectomy caused by harmful occlusal stresses. He instanced the danger to the opposing arch by having one arch splinted by describing a case where all the upper teeth were extracted following the successful treatment of the lower arch. Dr. Fish was inclined to be conciliatory in reply.

Mr. Blake suggested a Zelex impression over a compound one for the buccal surfaces of the teeth. Mr. Grewcock made a strong plea for observing the domain of the free way space in the alterations of the bite. Mr. Cross asked the speaker if it was not better to level the occlusal plane and develop optimal function before grinding. Miss Michaelis asked if Dr. Fish used orthodox design for partial dentures. Dr. Fish, in reply, said he did not believe harm would result after encroaching on the free way space, nor did he think selective grinding was beneficial because the most important forces acted on teeth not when the teeth were together but when a bolus of food was being chewed.

THE PROCEEDINGS OF THE BRITISH SOCIETY OF PERIODONTOLOGY

President: S. CRIPPS, L.D.S. R.C.S. Eng.

Hon. Secretary: H. THOMSON, L.D.S. R.F.P.S. Glasg., H.D.D. R.C.S. Edin.
53, Portland Place, London, W.1.

Vol. II, No. 2 January, 1952

PERIODONTAL SPLINTS

At the Twelfth Meeting of the British Society of Periodontology held at University College Hospital Medical School, W.C.1, on Dec. 10, 1951, a paper was given by Dr. E. W. Fish, C.B.E., M.D., F.D.S., on Periodontal Splints.

Dr. Fish defined a periodontal splint as an appliance designed to mitigate the lateral stresses on individual teeth by affording them mutual support, but at the outset made it clear that he considered periodontal breakdown was due to septic ulceration of the gingival pocket and not to traumatic occlusion. Once the breakdown takes place, however, adversely acting stresses of mastication may contribute to loss of bone and consequent loosening of teeth. Such stresses are a factor but never a primary cause.

Treatment of loose teeth by periodontal splint is never instituted until all septic inflammation in the pockets has been removed and good oral hygiene is being practised by the patient. This is usually effected by the operation of gingivectomy followed by the application of packs, which makes the success of the operation possible, and the use of wood points, which makes it permanent.

Before considering the specific treatment by splints, Dr. Fish presented the problem of drifting teeth, and in particular of the upper incisor teeth. This condition usually follows loss of posterior teeth and failure to make good the loss. The bite closes and the upper arch spreads, and the upper incisors protrude. The intraseptal fibres of these drifting teeth are lost and the problem of maintaining such teeth after their restoration in the arch is a difficult one, but it must be solved if the teeth are to be saved at all.

This problem, and that of reducing lateral stresses, is solved by a splint which covers the occlusal and lingual surfaces of the teeth, and where drifting incisors are being restored pin-fixation to inlays placed in the lingual surfaces of these teeth is used. In the upper the only tissue-borne part of the splint is a bar running across the palate. Thus all the teeth are united and maintained by mutual support. By flattening the cusps on the metal cover for the teeth lateral stresses are reduced.

The manufacture of the splint presents three problems, namely, the impression, the bite, and the casting. Dr. Fish then described in clear detail the technique of sectional compound impression which he uses. With regard to the bite he maintained that the inevitable raising of the bite presents no problem and is well tolerated by the patient. The bite record is taken in wax. The technique of casting is a job for the skilled technician. Once the splint is in place, emphasis is laid on the need for having the main weight of the bite in the premolar region and for free lateral movements.

Dr. Fish illustrated his technique by models and splints which were passed among the members while the lecture was in progress.

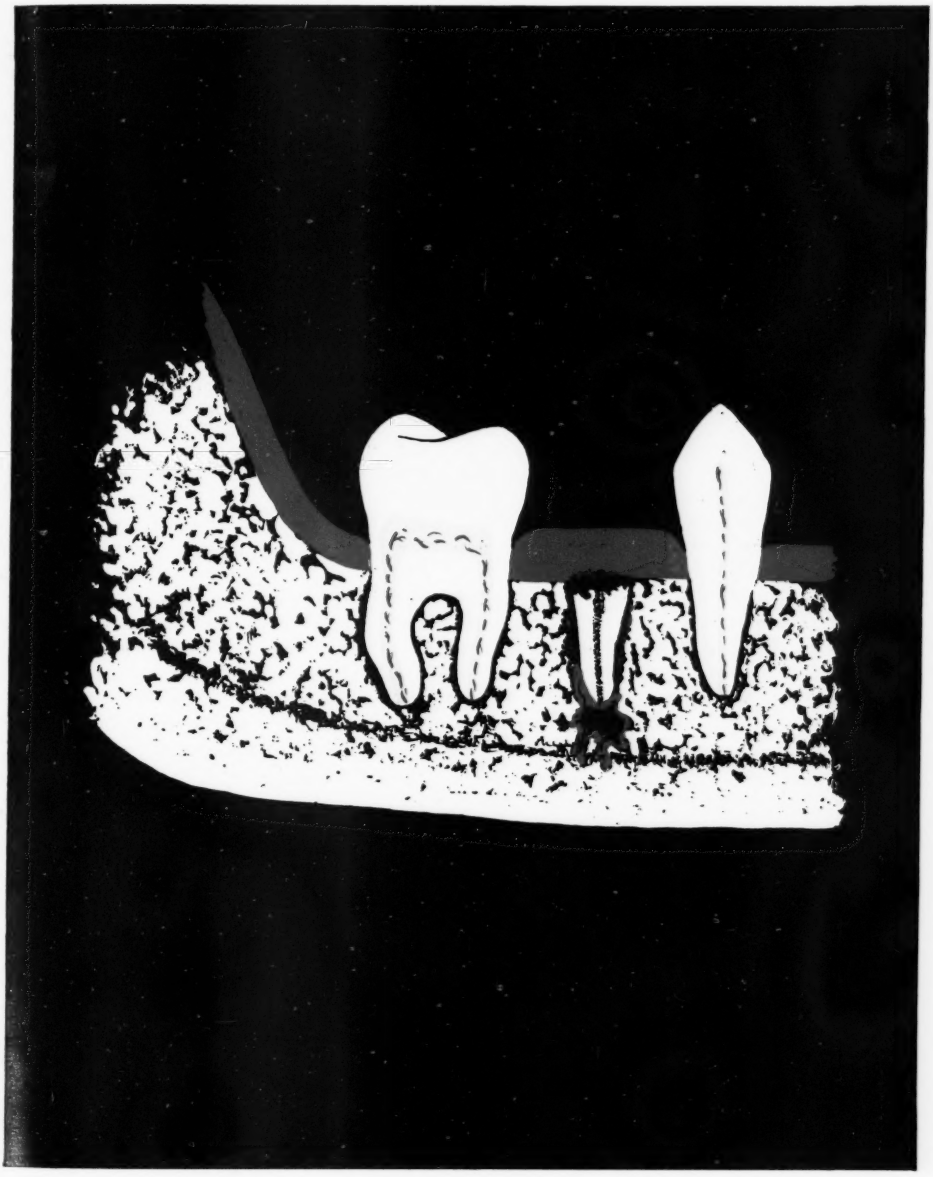
This paper was welcomed by prolonged applause and the Chairman, in thanking Dr. Fish, asked him about the necessity for having the main weight of the bite in the premolar region. Dr. Fish, in reply, said that in this way the pressure was better transferred to the whole splint, and that tipping was obviated.

[*Continued on p.* 153]

Issued with "The Dental Practitioner," January, 1952, Vol. II, No. 5

COLOURED CHART No. 9. (FOR YOUR PATIENT'S INSTRUCTION)

THE DANGER OF RETAINED ROOTS



Retained roots can be a source of infection as this picture shows. Such a condition may give rise to an obscure type of pain. A radiographic examination is therefore necessary to eliminate the hidden source of trouble.

OFFICIAL SUPPLEMENT OF THE

SURGICAL INSTRUMENT MANUFACTURERS' ASSOCIATION (INC.)

DENTAL LABORATORIES SECTION

Chairman: E. G. EMMETT, F.I.B.S.T.
Administrative Offices: 6, HOLBORN VIADUCT, LONDON, E.C.1
Telephone: CITY 6031

No. 10 January, 1952

Editorial Committee: MR. C. M. BOOTH; MR. H. J. POTTER, F.I.B.S.T.

EDITORIAL

WE hope you have enjoyed a "family Christmas" and are looking forward to a New Year of hope—certainly one of good service!

Since part payment of dentures has been brought into the National Health Scheme, the flow of work has continued to decrease and we not only learn of more "mushroom laboratories" closing down, but many reverting to the repair shop status.

The claim for wage increases for technicians was brought to a head at the last National Joint Council Meeting, and whilst many agree that an increase should be supported, they also feel that the extent of the increase must be controlled by economic considerations. It is to be deplored that the machinery of the National Joint Council has not been able to negotiate agreeable terms and that this important matter is now to go to arbitration under the Industrial Disputes Order.

We are informed that new legislation in dentistry is imminent and we hear many rumours of the form it will take. The position of the Dental Laboratories Section of S.I.M.A. in this most important matter must be made quite clear: One of the essential conditions of membership of our organization is that the prospective member, upon application, must sign his name to an Ethical Code, the context of which, very briefly, is that "he works in collaboration with the practitioner and that he must not profess, or advertise, that he is in a position to deal direct with the patient". Our organization is, however, prepared to co-operate to the full when this legislation takes effect.

Our minds will now be focused on our Annual Week-End Conference, full details of which are given below, and we hope you will make it your business to attend.

WEEK-END CONFERENCE, 1952

Programme

Headquarters: *Holborn Restaurant*
*London, W.C.*1

Friday, Feb. 8

ANNUAL DINNER AND DANCE

Reception 6 p.m.; Dinner 6.30 p.m.
Dancing 8 to 11.30 p.m. Tickets 28s. 6d. each.
Tickets obtainable from Mr. C. M. Booth, 26, Palmerston Road, Wood Green, London, N.22.

Saturday, Feb. 9

Morning

ANNUAL GENERAL MEETING, 10.30 a.m.
Informal Luncheon 1 p.m. to 2.15 p.m.

Afternoon

EXHIBITION OF DENTAL LABORATORY EQUIPMENT, APPLIANCES AND TECHNIQUES
2.30 p.m.
(To be given by members of the Dental Trade.)
Admission by ticket only, obtainable on request from Mr. C. M. Booth, as above.

NEWS FROM HEAD OFFICE

Abolition of Grade III.—The National Joint Council has agreed that as from July 1, 1952, entry into Grade III shall be prohibited and after that date employment of men in this category will only be permitted if they were in Grade III before that date. This will not prevent the employment of labourers in a laboratory provided they are not engaged on technical work in any way. As the N.J.C. do not regard people in this class as technicians, they do not propose to make provision for their wage or grading.

Wages Claim.—An offer by the Employers' side of the N.J.C. of Grade I £8, Grade II £7, and Grade III £6 per week (apprentices no change) has been rejected by the Employees' side and the matter has been referred to the Industrial Disputes Tribunal. In the opinion of many, any increase in wages in the present economic conditions can only worsen the position and adversely affect both employees and employers.

Wages during Sickness.—A motion has been tabled by the Employers' side of the N.J.C. that the wages and conditions of service should be amended to permit the employer to deduct from wages payable during sickness, the amount of any sickness benefit payable to the employee under the National Insurance Act. The Unions are now considering the proposal and their reply will be submitted at the next meeting of the Joint Council.

Representation of S.I.M.A. on N.J.C.—In order that S.I.M.A. may have an additional representative on the N.J.C. the B.D.A. have agreed to reduce their representation by one. The B.D.A. will, therefore, have 6 and S.I.M.A. 2 representatives on the Council.

Future Legislation.—We learn that whilst the Dentists' Bill is being presented to Parliament there is little likelihood of the Draft Bill for Dental Technicians being proceeded with in the near future.

Termination of Apprenticeship Indentures.—In view of the present shortage of work in laboratories, inquiries have been received as to whether apprenticeship indentures may be terminated or suspended on the ground that business has diminished; we are advised that this can only ordinarily be done:—

a. By mutual arrangement with all the parties to the Indenture.

b. By reason of the master's death.

c. On dissolution of partnership or if the firm divides itself into two or more new firms, neither of which carries on in its entirety the business to which the apprentice is bound.

d. Relinquishment of a branch or a change of trade or business.

Diminution of business would not therefore in itself be sufficient to terminate the indentures, provided that the master remained able to carry out his covenant to teach the apprentice. Suspension would be a breach of the Agreement by the master.

Insurance Schemes.—On the initiative of the London Regional Branch, inquiries have been made regarding a group Personal Accident and Sickness Scheme to insure employers against risks arising from the payment of wages during accident and sickness of employees. Members interested are asked to communicate with the Association. The matter will be further explored if there is a sufficient response from members.

Chrome Cobalt Alloys.—Further consideration has been given to various matters arising in connexion with these alloys and members may obtain useful information on application to head office. The use under the General Dental Services of Virilium, Pretallium, and Megallium has now been approved by the Minister of Health.

Standardization of Dental Materials.—A Dental Industry Standards Committee has been set up under the ægis of the British Standards Institution and a number of Technical Committees will be appointed, with some of which S.I.M.A. will be directly concerned. The B.S.I. had undertaken, when these Technical Committees have been appointed, to give attention to the desirability of S.I.M.A.'s representation.

Annual General Meeting.—Members are reminded that resolutions for the agenda and nominations to the Committee for election at the Annual General Meeting on Feb. 9 next, should reach head office at least 21 days before the meeting.

IS THIS WHAT YOU ARE LOOKING FOR?

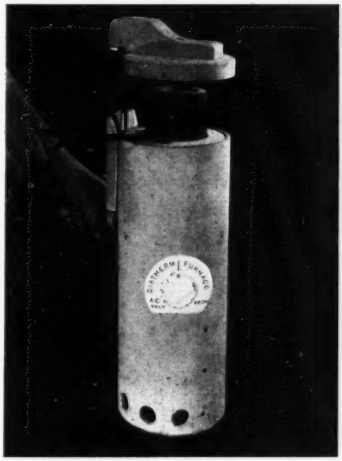
One of the pleasant features in the dental sphere these days is the increasing interest that dental technicians and our own members in particular are playing in the introduction and development of laboratory equipment, and it is pleasing to be able to introduce yet another item designed by one of our fellow members:—

"This is a piece of equipment that promises much for future convenience and comfort in dental laboratories, and is a furnace for the electric heating of the largest moulds for castings.

"The most arresting feature is the vertical construction, enabling the hearth and lid to be raised with one movement of the left hand, while the right hand is free to remove the mould; not so apparent, but equally important, fresh air entering ports in the basal circumference, in its upward passage to the central vent hole, scavenges the corrosive gaseous products of the heating away from the heating helix and casting ring. This continual supply of fresh air also provides the ideal atmosphere for the complete oxydizing of carbonaceous wax residues.

"Supply mains voltage is reduced to 50 by a double-wound transformer fixed in the base of the jacket. A short, thick, and therefore robust, compact, and efficient heating resistance may thereby be run at a high amperage with no possibility of shock.

"The heat source is equidistant from the mould ring at all points, so that uniform heating is assured. Set normally to heat the largest plaster-based investment mould to 750° C. in two hours, 750 watts are consumed at 220 volts: a simple plug position change connects to different transformer windings to run the largest ethyl silicate bonded investment mould up to 1000° C. in a further few minutes, during which 1000 watts are consumed at 220 volts. Energy consumption is remarkably low, being less than double a household electric iron. No energy is dissipated in outside resistances during preliminary stages, so that at a penny a unit the cost of taking the largest ring to the higher temperature is twopence. It should be noted that the furnace may only be used on a.c. mains."



The Diatherm furnace. Hearth and lid rise together, and the mould is removed laterally.

THE SECOND DENTAL BRAINS TRUST

The Second Dental Brains Trust held under the auspices of the Dental Section of the Institute of British Surgical Technicians at the Eastman Dental Clinic on Nov. 20 aroused much interest, and a representative audience not only listened with close attention but added their quota to the discussion.

The Team comprised Mr. K. P. Liddelow, F.D.S., H.D.D., Senior Lecturer in Dental Technology at King's College Hospital Dental

School, Mr. J. E. Seear, L.D.S. R.C.S., Editor of the DENTAL PRACTITIONER, Mr. Walter J. Bell, President of the Harley Study Group,

Left to right: Mr. H. J. Potter, Mr. W. J. Bell. Mr. C. B. Phillimore (Question Master), Mr. J. E. Seear, and Mr. K. P. Liddelow.

and Mr. H. J. Potter, F.I.B.S.T., a member of the Dental Education Committee of the Institute.

The proceedings were conducted by the Question Master, Mr. C. B. Phillimore, F.I.B.S.T., Chairman of the Dental Education Committee of the I.B.S.T., who introduced the Team and ably summed up the discussion after each question. The questions, which had been submitted by members of the Institute and were previously unseen by the Trust, covered a wide range of technical and educational topics in the field of dentistry and the Team's observations were followed with close attention by those present, many of whom took advantage of the invitation to add their comments.

Mr. E. G. Emmett, F.I.B.S.T., thanked the organizers for arranging such an entertaining and educational evening, and Mr. Phillimore expressed appreciation of the way in which the Team had given their time and so charmingly placed their knowledge at the disposal of the audience.

The Institute is indebted to Mr. G. Maurice Down, F.I.B.S.T., Chairman of the Education Committee of the Institute, for making a sound recording of the proceedings.

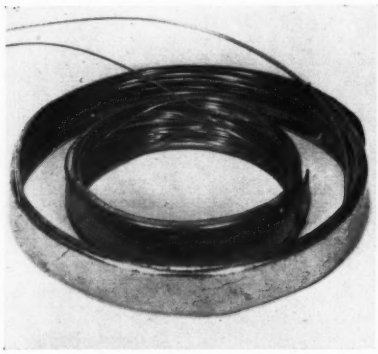
ODDS AND ENDS

Collected by **D. M. BEAUCHAMP**

How to Tackle the Dust Problem in the Laboratory.—In our laboratory all wooden floors and shelves are treated with "Dustolio", a dust-allaying oil, supplied by the Sanitary Floor Co., of Ely Place, London, E.C.1, at a cost of 8s. 6d. per gallon. They will send full particulars and supply a special wire and bristle broom for sweeping. "It is incredible how the dust has disappeared."—R. Cortazzi.

How to make the Lathe Chuck Last Longer.—Being troubled with the screw thread on brush chucks wearing out quickly, and new chucks needing to be fitted, always during a rush period, we have prolonged their life by having all chucks case-hardened. This is quite easily and cheaply done by any good cycle shop or garage, and will give a considerably longer life and will well reward the small cost.

Circular Holder for Springy Wire.—The tin clips which retain the caps on potted meat jars, when discarded and reclipped, make convenient holders for coils of springy wire. The



Jar cap clips as holders for springy wire.

size of the wire may be stamped or engraved (enscribed) on the side.

X RAYS

PRODUCTION: PENETRATION: DEFINITION: FILM PROCESSING TECHNIQUE

At the fourth Annual Demonstration meeting held at Norbury, the members of the Croydon Branch were privileged to secure the presence of Mr. G. H. Hepple, of the X-ray Department of Phillips Electrical Ltd.

Mr. Hepple, author of a valuable handbook entitled *X Rays in Dental Practice*, assisted by a colleague, Mr. Box, went to much trouble with the exhibits, some of which consisted of heavy equipment, to explain the fundamentals and application of X rays in dentistry.

The following is a written version of his talk, which was repeated seven times as those present moved in parties from table to table.

As a simple introduction to the subject and without reference to the physical concept, it may be stated that X rays are generated when, within a vacuum tube, a piece of metal, usually tungsten, is bombarded by electrons. The two main electrodes in the X-ray tube are the anode and cathode. The anode is usually made from a bar of copper into one end of which is inserted a piece of tungsten and in some instances the anode is a solid bar of tungsten one end of which is "faced off" and opposite to the cathode. The cathode is a special alloy cup with a recess in the end. In this recess is mounted a coil filament of tungsten wire and when the filament is electrically heated the electrons which are liberated, cluster around it. When a high potential is applied across the tube and the anode is positive a stream of electrons is accelerated towards the anode and bombard the tungsten target at very high velocity. The recess in the cathode serves to focus this stream on to a well-defined area in the middle of the tungsten target, which is known as the focal spot. It is this collision or bombardment which generates X rays. The heat given off as a result of this bombardment is considerable and amounts to more than 99 per cent of the total energy employed, only the remaining 1 per cent being represented by X radiation.

X rays: Penetration.—X rays are similar to light rays, but as they are of much shorter wave-length they have the property of penetrating substances which are opaque to light. X rays, because of their penetrating properties, will throw shadows on a photographic film of any material found in their path, such as a hand, with bones, muscle, and other tissue, or a purse containing coins of

Mr. G. H. Hepple lecturing on the application of X rays in dentistry.

different metals which will exhibit areas of varying density, the denser parts absorbing more of the radiation that the lighter parts and so forth according to degree. (To illustrate this a fountain pen was placed in front of a fluorescent screen, when the metal inserts could be clearly distinguished from the plastic body.)

The effect is similar when using X rays; for instance, for the detection of dental caries. Where there are cavities due to dental caries less X rays will be absorbed than by the rest of the tooth which has no decay or cavity, and will be shown up on the radiograph as a dark area. It is in this way that one is able to differentiate in the case of teeth enamel, dentine, pulp chamber, nerve cavity, and alveolar process, etc.

Radiographic Definition.—This depends upon (*a*) the smallness and shape of the focus, (*b*) the focus–film distance, (*c*) the distance of the object from the film. For physical reasons it is impossible to reduce the focus to pin-point size as the load required across the X-ray tube in

dental radiography would be such that the tungsten target would melt, thus destroying the tube. The target is made of tungsten because of its density and refractory characteristics. The area of the focus is determined by the maximum permissible temperature and the power input to the tube as a function of time. In Phillips X-ray tubes the line focus principle is used, so that the smallest possible effective focus is obtained for the tube load employed, which ensures maximum definition.

Preparation of the Developer and Fixer Solutions and Processing Technique.—Three small tanks should be used, one for developing, one for fixing, and one for rinsing and washing of the films. The fixing and developing tanks for dental work should be of half-gallon capacity. Whenever new solutions are to be prepared the tanks should be thoroughly washed with water, but on no account should soap or other cleansing agents be used unless great care is taken thoroughly to rinse with water.

Separate stirring rods clearly marked should be kept for both developer and fixer. The solutions in the tanks should be renewed about every six weeks. This will, of course, depend upon the amount of film processed. Instructions given by the manufacturer of the chemicals as regards the order in which they are to be dissolved should be strictly adhered to.

Development Technique.—The developer should be stirred so that an even temperature reading may be made. If necessary the electric immersion heater should be used to bring the temperature up to 65° F. (18° C.). If the temperature is more than 65° F. and not greater than 75° F. the necessary correction in accordance with the standard time-temperature scale must be observed. If the temperature is more than 75° F. it must be allowed to cool. Now, under the darkroom safelight, films may be unwrapped and completely immersed in the developer, and before allowing them to rest in the solution they should be agitated gently to eliminate any air bubbles that may collect on the surface of the film. The development timer is then started. When the end of the development period has been reached the films should be passed into the washing tank and thoroughly rinsed by dipping them in and out for 20 seconds, and from there into the fixer, where they should again be agitated before allowing them to rest. The films should be "clear" after 2½ minutes in the fixer, and may then be exposed to white light. If the film is required hurriedly it may be taken into the consulting room and the necessary observations made. It should then be returned to the fixer until it has been immersed for 10 minutes, which is the complete fixing period. They should then be passed into the water tank and allowed to remain for one hour. If running water is available this should be allowed to run gently. If there is no running water available the water in the tank should be changed frequently and films after immersion for one hour should be dipped in and out gently about 20 times before hanging them up to dry.

The foregoing technique should result in perfectly processed films provided all conditions are right.

Manufacturers of X-ray apparatus for dental work can only give average exposure times because of the variation in density in individuals of the parts under examination. In other words, what may be a correct exposure for patient A may be a slight under- or over-exposure for patient B. Also deterioriation of the developer must occur after a time.

The above variations, if only slight, will not detract appreciably from the diagnostic value of the film provided the standard exposures are given and the time-temperature development technique is used.

The importance of accurate time-temperature development cannot be over emphasized. If this is strictly adhered to and assuming that the processing chemicals are in good condition, a film after processing having a "thin" appearance will be due to under-exposure. Conversely, if the film is very dark in appearance and detail difficult to observe, it is obviously over-exposed.

From this it will be appreciated that time-temperature development can be of great assistance in arriving at the correct exposure technique. *This can only be completely reliable, however, if the X-ray output is of constant intensity and uniform quality.*

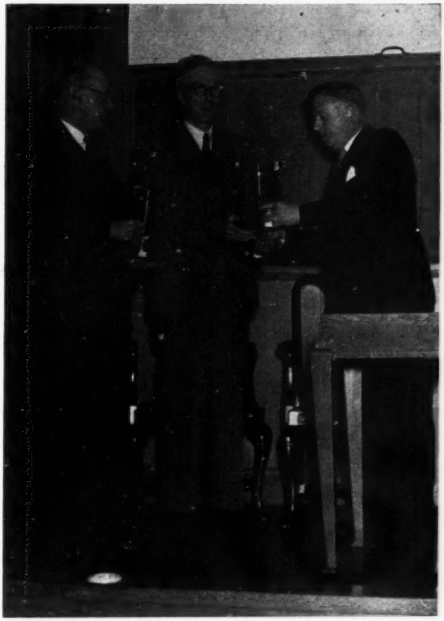
INSTITUTE OF BRITISH SURGICAL TECHNICIANS

Presentation to the Borough and North-Western Polytechnics

The Presentation of a Model Surveyor was made by Mr. Chas. B. Phillimore (Chairman) on behalf of the Dental Section of the Institute of British Surgical Technicians to the Borough Polytechnic and the North-Western Polytechnic on the occasion of the opening lecture of the season at the Eastman Dental Hospital on Tuesday, Oct. 23. Mr. Phillimore, in making the presentation, referred to the Institute's interest in the encouragement of teaching methods of all kinds in dental technology and their indebtedness to the Instructors who were so gallantly conducting the classes at the Polytechnics. In recognition of that work he asked the Principals of the two Polytechnics to receive from the Institute these two instruments for the use of the technicians of tomorrow.

Dr. Pickering said he was very pleased to receive this gift on behalf of the Borough Polytechnic, not only because it was a useful instrument but because it indicated the interest that responsible people in the Craft were now showing in the classes. There was undoubtedly a new spirit of recognition that the apprentices must be given opportunities to learn their craft in a systematic way.

Dr. Docherty, on behalf of the North-Western Polytechnic, thanked the Institute for the gift because of its intrinsic value and usefulness, but above all because it was a token of appreciation which would encourage the instructors who were taking the classes in dental technology. Although they were newcomers in this field as compared with the



Borough Polytechnic, they were proud of their little laboratory and hoped to get it properly equipped in time.

NEWS FROM THE BRANCHES

Croydon Branch.—The Branch meeting was held on Nov. 23, 1951. At this meeting Mr. Nowers, the Branch secretary, read a letter from Mr. Emmett, Chairman of the Dental Laboratories Section of the Association, urging members to make full use of the DENTAL PRACTITIONER and to try to increase its circulation. A report given by Mr. Nowers of the Main Committee meeting gave rise to much discussion on various points.

In future meetings will be held on the third Friday of each month, and this will allow time for reports to be submitted for publication in the next issue of the supplement. (*See* p. 159.)

West of Scotland Branch.—Mr. A. B. Rae has been appointed Branch correspondent.

Report on Leicester Meeting, Dec. 1, 1951. —Mr. E. G. Emmett, Chairman of the Dental Laboratories Section of the S.I.M.A., addressed a well-attended meeting at the Bell Hotel.

In his speech, Mr. Emmett covered the aims and ideals of S.I.M.A. and spoke of the achievements to date, with particular emphasis on the contribution made by members of

the Association to the educational aspects and prospects of the dental technician.

He was also very pleased to be able to report that representation on the National Joint Council had now been increased to two.

The meeting had been called to explore the possibilities of founding a branch in Leicester of the East Midland laboratory owners and was attended by representatives from Nottingham, Peterborough, Grantham, and Leicester.

Many questions were put to the speaker—in particular, questions relating to the five years' probationary period for new members before being allowed to vote.

The place of ancillaries in dentistry caused considerable discussion, and the speaker reminded the members that the Main Committee were guided in their policy by recommendations from the Branches and that the Annual General Meeting was the correct place to voice opinions on their policy.

After an interesting and informative meeting it was agreed that a meeting should be held on Saturday, Jan. 19, 1952, at 11 a.m. at the Bell Hotel, Leicester, for the express purpose of forming a branch of the Association.

Mr. E. Symons, 13A Mill Hill Lane, Leicester, who occupied the chair at this meeting, was appointed acting secretary until the next meeting.

North-Western Branch.—At a meeting held at the Empire Hotel, Preston, on Nov. 18, 1951, the election of Officers resulted as follows:—

Chairman: Mr. C. Staton, of Preston; *Vice-Chairman*: Mr. W. Mayall, of Accrington; *Secretary*: Mr. C. Bradshaw, of Pendlebury. Afterwards Mr. R. C. Atherton gave an interesting talk on "Maxillo Prosthetics" illustrated by specimens he had prepared, i.e., optic, aural, and nasal.

OBITUARY

It is with deep regret that the Birmingham branch of S.I.M.A. have to announce the death of Mr. F. Richardson, the owner of the Priory Dental Laboratory, Birmingham. Mr. Richardson, who was 46 years old, died on Friday, December 28, 1951. A native of Northumberland, he came to Birmingham 12 years ago. He leaves a widow and one son, to whom we extend our sincere sympathy.

S.I.M.A. (DENTAL LABORATORIES SECTION) DIARY

Croydon Branch (*Secretary*: Mr. H. J. Nowers, F.I.B.S.T., 86, Croydon Road, Beddington, Croydon). — Annual General Meeting, Jan. 18, 1952, at The Six Bells, Handcroft Road, Croydon.

Lecture by Lt.-Col. Schmidt in April, 1952, on "Partial Denture Construction", at the Public Library, Norbury.

North-Western Branch (*Secretary*: Mr. C. Bradshaw, 20, Dalton Drive, Pendlebury, Lancs).—Meeting, Feb. 3, 1952, at the Empire Hotel, Preston. Lecture on "Orthodontic Appliances", by Mr. E. Whittaker, of Windermere.

South Wales and Monmouthshire Branch.—Meetings Jan. 3, and Feb. 7, 1952, both meetings at the Royal Hotel, St. Mary Street, Cardiff.

West of Scotland Branch (*Secretary*: Mr. J. S. Fountain, F.I.B.S.T., 21, Circus Drive, Glasgow, E.1.).—Annual General Meeting, Jan. 14, 1952, at the Bath Hotel, 7.30 p.m. Chairman: Mr. T. S. Reid.

CAN YOU BELIEVE IT?

In the rush and bustle of life there are many things which are overlooked, and one which keeps turning up in professional laboratories at regular intervals is from the dentist who sends an impression of a mouth, having taken the impression with the denture in situ, with the instructions to add extra teeth to the denture where necessary. But lo and behold, what has the dentist done? He has taken the denture out of the impression and given it back to the patient!